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July 9, 1955

VOL. 68, NO. 2 PAGES 17-32

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Beating Heat Studies

See Page 30

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

wax from gas... an heir that can earn his own way

Modern-day myricyl

Here's a razzle-dazzle play in the game of "polyethylene," which is now providing so much fun for the chemical industry.

We've made a wax out of it. Now we're in the wax business.

The familiar polyethylene plastic, after all, is nothing but hydrocarbon chains, a thousand or two carbon atoms long, arrayed into some crystallographic orderliness. Produce shorter chains, oxidize a trifle, and compare with esters like myricyl cerotate ($C_{28}H_{51}COOC_{21}H_{45}$), the prom-



inent constituent of carnauba wax), myricyl palmitate ($C_{18}H_{37}COOC_{18}H_{35}$),



which is what beeswax largely consists of), or the cetyl palmitate ($C_{18}H_{37}COOC_{18}H_{35}$) of spermaceti. The



resemblance turns out to be more than coincidental. And it is more up to date to get your raw materials out of a hole in the ground than from the fronds of some faraway palm tree or the head of a sperm whale.

So it comes to pass that alongside such scriptural-sounding cargos from distant ports as ouricury and candelilla, we plunk down the trademark "Epolene." It sounds less ex-



pensive, and it is. It looks (left) easier to handle and melt down than old-fashioned waxes, and it is. It is compatible with all of them—animal, vegetable, and mineral, except that the all-hydrocarbon, non-

emulsifying (no hydrophilic carboxyls) type designated "Epolene-N" is incompatible with certain components of candelilla and ouricury.

It upgrades paraffin in flexibility, dielectric properties, hardness, higher melting point, higher blocking temperatures. The "Epolene-N" gives polishes better gloss, hardness, and scuff resistance than some costlier waxes. It stiffens candles, bodies printing inks, flats lacquers. In rubber compounding, it is an effective calender release agent for the milling operation. The emulsifying type "Epolene-E," can provide, effectively, 100% of the solids for self-polishing waxes. ■

It's the fellow who works out an idea with Epolene Polyethylene Wax that others hadn't thought of who may wax the wealthiest. For samples, data sheet, prices, or well-mannered salesmanship, write Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company).

K's grandson

Were you around in 1930? Statistically, "no" isn't too improbable an answer, sophisticated as you may now prefer to consider yourself. Somewhat more likely, you were a rather young party at the time but old enough to be held in thrall by a certain wonder-world to which 15¢ admitted you on occasional Saturday afternoons. It is just possible that by 1930 you had progressed enough in years and goods to make your own Hollywood with the new Cine-Kodak Model K Camera. Growing economic unease or not, a lot of amateur moviemakers saw fit to invest in that unattractive 16mm movie camera. When you consider how many of those original Model K's are still making happy movies this very summer, it doesn't seem to have been so foolish an investment. How many other personal hard goods of the period are still so treasured?

Before more mist clouds our eye, let us reveal the brand-new model. This heirloom-to-be is designated the *Cine-Kodak K-100 Camera*. Be-

ing a product of the fifties instead of the thirties, it looks better suited to flying through the air with the greatest of ease. Functionally as well, 25 years have wrought improvements.

As in the long ago, the *K-100* takes its film from a roll to line it up precisely with the lens axis, but lenses like the *Kodak Cine Ektar II 25mm f/1.9 Lens*, the *Cine Ektar 25mm f/1.4*, and other *Cine Ektar Lenses* from the 15mm wide-angle to the 6X telephoto could not have been made before Kodak rare-element glass was invented. Also, there



has been progress in spring motors: one winding of the *K-100* can pull 40 feet of film.

There is good economic reason for these and many other such refinements in the *K-100*, aside from the not unworthy one of giving the amateur cinematographer all that his heart could desire. Unlike its 1930 ancestor, the *K-100* has to earn its way at functions more serious than garden parties. The factory time-and-motion-study man must be able to regard it as reliable professional equipment. So must the athletic coach, the TV news cameraman, the audio-visual educator, the industrial or medical photographer, the insurance investigator, the scientist or engineer who uses its electric-motor-drive provision to get a time-lapse study of corrosion or the fleeting tale told by a cathode-ray oscilloscope.

All this for \$269 with f/1.9 Ektar Lens. Your Kodak dealer awaits your call.

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This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are... serving laboratories everywhere

Kodak
TRADE-MARK

ARCHAEOLOGY

5,000-Year-Old Pottery

Evidence uncovered for linking the Iranian Plateau with the Indus Valley. Water, now scarce in Mekran, was once more plentiful there, the expedition's findings showed.

► NEW EVIDENCE for linking the Iranian Plateau with the Indus Valley was obtained by the Peabody Museum-Harvard Expedition to Pakistan.

Dr. Henry Field, anthropologist and leader of the expedition, told SCIENCE SERVICE upon his return to Coconut Grove, Fla., of the discovery of new archaeological sites in little-known Mekran that yielded beautiful painted pottery about 5,000 years old.

Soundings in a small mound near the center of this inhospitable desert region revealed a splendid series of terra cotta figurines of humped bulls characteristic of the classical site of Mohenjo-Daro on the river Indus.

Some of the painted pottery bore naturalistic designs similar to those found in Iran and at Kish and Ur of the Chaldees in Iraq, formerly Mesopotamia.

Since water is now very scarce in Mekran, it was deduced that in Chalcolithic times the climate was different, with considerably more rainfall than the present seven inches annually. Desiccation is increasing in this region.

The expedition consisted of Dr. Field, who was accompanied by Mrs. Field as photographer and recorder, a member of the Pakistan department of archaeology and four specialists from the University of Karachi. Travel was by jeep, truck, camel, horse, bull and on foot.

Crossing of the Baluchistan desert from the Arabian Sea to Quetta was made in 21 days under difficult conditions.

The Baluchis proved to be very friendly, although they were puzzled by the foreigners who measured and photographed them, purchased their household goods, picked up broken pottery from mounds, chased and collected snakes and lizards, and dug up plants, often during the blazing heat of the day.

The expedition obtained anthropometric data and photographs on 275 Baluchis and Brahuis that will throw light on the racial connections between Baluchistan and Iran.

To show the fast-changing culture of the Baluchis, an important ethnological collection of costumes, jewelry and household utensils was purchased. Tape recordings of their music were made with a battery-operated machine. Plants and animals were also collected.

Crossing to Bahawalpur State, which adjoins the Indian frontier with Bikanir, the expedition made a 500-mile reconnaissance survey along the now-dry Hugra River bed. Here painted pottery of Mohenjo-Daro and Harappa types was collected from a chain of mounds from Fort Derawar to east of Fort Abbas.

Photographs and observations were made on the living peoples of this region for comparison with the data from Baluchistan. Some early manuscripts, which may throw light on the history of the region, now known as Cholistan, were photographed.

Dr. Field reported receiving the utmost assistance from the Pakistan Government. Specimens collected are now on the way from Karachi to Harvard for study.

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MEDICINE

Quieting Drugs Increase Effect of Sleeping Drugs

► TWO QUIETING drugs that are winning wide attention as aids in treating mental disease can potentiate the effects of ethyl alcohol and the barbiturate family of sleeping medicines.

The two quieting drugs are reserpine and chlorpromazine. Neither of them is a sleeping medicine. Patients taking them are calmed but do not feel sleepy.

Animals that had just recovered from a barbiturate almost immediately went back into deep hypnosis when given chlorpromazine. This shows that it is a true potentiator, and not merely a prolonger of the action of the barbiturate.

This research with the quieting drugs is reported in *Nature* (June 25) by Drs. Bernard B. Brodie, Parkhurst A. Shore and Stanley L. Silver of the National Heart Institute, Bethesda, Md., and Dr. Robert Pulver of the Geigy Company, Basel, Switzerland.

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AERONAUTICS

Plane "Snaking" Can Be Caused by Air Turbulence

► AN EXPLANATION of the periodic wobbling of airplanes during flight has been proposed by engineers at the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics, Langley Field, Va.

Wind tunnel tests showed that atmospheric turbulence could cause this "snaking," which decreases the accuracy of aerial guns and is a nuisance to pilots.

The new theory would explain some of the instances of wobbling that cannot be laid to other causes, John D. Bird of the Laboratory said. In the past such factors as small amounts of slack in the rudder control system and the effects of sloshing fuel have been blamed for snaking.

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SOLAR-POWERED TELEPHONE EQUIPMENT—The solar battery will receive its first practical test in a telephone system this summer when an experimental unit, essentially identical to the model shown, will be installed in Americus, Ga., to supply power to terminal equipment on rural telephone lines. Heart of the Bell Telephone Laboratories solar battery is a tiny silicon disk that converts sunlight into electricity. (See SNL, May 1, 1954, p. 278.)

METEOROLOGY

Radar Tornado Warning

► TEXANS HAVE inaugurated a regional tornado-warning system using radar that is expected to become nation wide.

The 24-station system not only blankets the Lone Star state but reaches into Arkansas, Mississippi, Louisiana and Oklahoma. It was officially dedicated at College Station, Texas, on June 25, in ceremonies attended by State and Government officials and weathermen from all parts of the country.

The radars give weathermen information they need to issue warnings when twisters may strike.

The network has already resulted in saving of life and limb. In 1954, with only eight stations in actual operation, 17 alerts for possible tornadoes were sounded. Six twisters followed, striking heavily populated areas, with only three deaths.

Development of the system, which followed the disastrous tornado that hit Waco, Texas, on May 11, 1953, killing 114 persons, involved cooperation of many individuals and civic groups. Cities participating pay about \$10,000 each for modification and installation of surplus Government radar sets, which are then operated around the clock by Weather Bureau meteorologists.

PHYSIOLOGY

Susceptible Ears Selected

► A 20-MINUTE test that might detect in advance workers whose ears may be damaged by intense noise in factories was suggested by Dr. J. E. Goodwin of the University of Toronto at the joint meeting of the British and Canadian Medical Associations in Toronto, Canada.

There has been an increasing awareness in recent years that deafness can be caused by continuing exposure to high level noises once considered harmless, Dr. Goodwin said.

About six months ago the University of Toronto began studying workers at a steel-fabricating plant. They studied persons whose ears could apparently withstand high level noise and those whose hearing seems to be affected by it. The factory had a variety of noises ranging from 96 to 126 decibels.

Tests were made on the ears of more than 60 volunteers and also on 12 men picked to determine whether those particularly susceptible to noise could be distinguished from others.

The men were given an audiometer test to determine their acuity of hearing. Then through an earphone on one ear at a time they were subjected to what is called white noise. This is produced electronically in a vacuum tube and sounds like the highly-amplified hissing of escaping gas.

The person being tested listens to the

The modified sets have a range of about 200 miles in which the squall lines where tornadoes are born are spotted and tracked. Information gathered by the 24 stations, some of which can get a 3-D picture of the storms, will eventually benefit all residents of the United States, Capt. Howard T. Orville predicted.

Capt. Orville, a retired Naval officer now affiliated with the Friez Instrument Division of Bendix Aviation, Baltimore, Md., is chairman of the Government's Advisory Committee on Weather Control.

The dedication was one step in fulfilling a prediction he made in January, 1953, that the United States would be covered within 10 years by a national electronics network for reporting weather conditions, with particular emphasis on the severe storms that annually cause millions of dollars in damage.

Instrumental in getting the radar network started were Dr. David H. Morgan, president of the A & M College of Texas, Dr. Earl Hardy, regional director of the U. S. Weather Bureau, and William McGill, on the staff of Texas' Governor Allan Shivers.

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noise for ten minutes and then the audiometer test is repeated. The audiometer is able to gauge any temporary loss of hearing that the white noise has caused.

Dr. Goodwin, charting his results on a graph, found that the subjects fell into two clearly separated groups of which five out of the 12 had extraordinary susceptibility to intense noise.

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ARCHAEOLOGY

Tools of Ancient People Found in Mexican Desert

► STONE KNIVES and other tools of an ancient people who lived in a Mexican desert area, perhaps as much as 5,000 years ago, have been found by Dr. George E. Fay of Joplin, Mo. The site is near what is now Hermosillo, capital of Sonora, Mexico.

The ancient implements are made chiefly of slate and shale but some are of jasper, quartz and rhyolite porphyry (rock of lava origin).

Shaping and workmanship on the tools indicated, Dr. Fay said, that the people were possibly a variant of the Cochise culture in Arizona. This group formerly was thought to have lived only in a limited area in southeast Arizona and the southwest corner of New Mexico. Anthropolo-

gists are interested in the possibility that this ancient people may have extended as far as Sonora. The group has been dated in Arizona approximately 3,000 to 500 B.C.

Among the tools are wedges which Dr. Fay believes may have been used to open mussel shells. The area where the finds were made is now a stretch of flat desert with no immediate evidence of a natural water supply. The Sonora river is about one or two miles to the south.

Altogether, seven campsites of the ancient people that Dr. Fay has named Peralta have been examined.

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SCIENCE NEWS LETTER

VOL. 68 JULY 9, 1955

NO. 2

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D.C., NOrth 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U.S.A. Entered as second class matter at the post office at Washington, D.C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U.S. Code 283), authorized February 28, 1950. Established in mimeographed form March 19, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, Eldorado 5-5666, and 435 N. Michigan Ave., Chicago 11, Superior 7-6048.

SCIENCE SERVICE

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PSYCHOLOGY

Hints for Safe Driving

If you have not had an automobile accident recently, it is a good idea to be especially careful, statistics have shown, since over-confidence may cause collision.

► DRIVERS PREPARING to take a long auto trip over a weekend might well take some hints from an accident prevention report from Dr. Ross A. McFarland of Harvard School of Public Health, Boston.

If you have not been in an accident lately, be especially careful, is one warning from Dr. McFarland's report. Statistics show that the longer it has been since a driver's last collision, the more confident he gets of his own driving abilities, the more chances he takes, and the more likely he is to get into another one soon.

On long trips, take a break or change drivers every few hours. Do not trust yourself as a judge of your own fatigue, for it creeps up on you without your realizing it.

Tests have shown that while the fatigued driver is operating less skillfully, he thinks he is doing as well. He has less tendency to recognize or appreciate his errors, and there may be loss of insight into the seriousness of oncoming trouble.

Under extreme fatigue, drivers have been known to have hallucinations and swerve off the road to avoid non-existent obstacles.

A complex, skilled operation like driving deteriorates in characteristic ways over a prolonged time. One initial effect is bad timing. At first, it is likely that the right response is made, but at the wrong time. In later stages of driver fatigue, gross mistakes may appear.

As fatigue increases, the field to which the operator must react as a whole loses its integrated quality and the driver reacts to isolated parts of it. Some stimuli predominate, others are ignored. Important responses are sometimes omitted.

By all means do not even have "one for the road," since studies indicate that the likelihood of accidents increases even at low levels of alcohol in the blood. Higher levels of alcohol content are characterized by sharply increasing accident probability.

Keep the air circulating in the car. The discomfort of stuffiness adds to fatigue and to the possibility that small quantities of carbon monoxide vapors from the engine may affect your awareness.

A study at a toll station has shown that, after speeding on good highways, drivers lose their orientation to speed and sometimes approach at dangerous velocities.

Another study showed that, as a rule, critical situations develop very rapidly and are of short duration. The most important variables contributing to dangerous situations in a recent survey of near-accidents included: following too closely, following too closely while approaching to pass, operator inattention (or dozing at the wheel), vehicle running off the road, intersection

errors, errors in passing, operating in wrong lane of traffic, leaving and entering roadway, and pedestrian errors.

Driving is considerably more hazardous at night, National Safety Council figures show. Based on the national average, three times as many accidents occur at night as during the day, and the danger is greater at night on rural roads than in the city.

Last year the fatality rate of motor traffic was 6.5 per 100,000,000 miles of travel, with approximately 36,000 deaths and over a million disabling injuries. It has been estimated on the basis of present trends that one person out of every ten in the United States may be killed or injured in a motor vehicle accident within a period of 15 years.

Dr. McFarland's report was made to the Society of Automotive Engineers.

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ENGINEERING

Increase Turbine Power Without Additional Fuel

► ENGINEERS MAY soon be able to squeeze as much as 50% more power from a gas-turbine engine without additional fuel.

A new experimental exhaust attachment with no moving parts makes this possible. A spray of water and a device called an aerothermopressor are used.

The system requires too much water for application in turbine engines in planes but initial experiments, reported in *Research Reviews* (June) by Ascher H. Shapiro of Massachusetts Institute of Technology, indicated it would improve larger engines used on land and on ships.

Its principal application may be to increase the power output of the less efficient gas turbines. For today's most efficient gas turbines, the system would produce a 20% increase in power with the same fuel consumption and same machinery size. For turbines with lower efficiencies, it would raise the power as much as 50%.

In a conventional gas-turbine engine, high pressure combustion gases, forced through the blades of a turbine, spin a wheel, much as the wind turns a pinwheel. The efficiency of the system would be increased if pressure beyond the blades could be lowered to give a greater pressure difference.

Injecting water into the turbine exhaust achieves this by cooling the gases. The cooler air then passes into the aerothermopressor, which increases the pressure again before the gases are exhausted into the atmosphere.

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FABRIC WINDMILL—A small model of the new Rotafoil paracabute developed by the Radioplane Company of Van Nuys, Calif., is demonstrated by its inventor, E. G. Ewing, using an electric fan. The paracabute provides greatly increased drag and stability characteristics.

ENGINEERING

Truck Lane at Upgrades Relieves Road Congestion

► A COMMON sight on the highways is a truck crawling up a hill, followed like a mother duck by a brood of cars.

One way to remove this inconvenience to drivers, a special uphill lane for trucks, has been investigated in a new report by the Highway Research Board, Washington. Test strips have met universal acclaim by motorists and truck drivers who asked when more were going to be built. They relieved 65% to 70% of the congestion on a two-lane road and are believed to have reduced accidents.

A 1,000-foot side lane on a six percent grade theoretically should allow 14 cars to pass a crawling truck, but only nine passed in the tests.

The truck lane should extend over the crest of the hill, the researchers pointed out, to a point where truck speed comes close to that of autos.

At all locations where the extra lane was built, congestion was materially reduced.

Physically, the road must be made wider at pass-by points, with a single downhill lane marked by a double stripe and two uphill lanes separated by a dashed line. Signs well ahead of the lane inform trucks to keep right and a painted arrow on the road directs them into the proper lane.

The tests were reported by William E. Willey, engineer for the division of economics and statistics for the Arizona Highway Department.

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SOCIOLOGY

Spend Summer in Slums

Thirty U. S. and foreign students are living in Philadelphia slums to get first-hand knowledge about job and living problems of unskilled workers.

► THIRTY U. S. and foreign students are voluntarily living and working in one of the most crowded areas of Philadelphia this summer. Their reason is to learn about the problems of slum people by direct experience.

Students from Japan, India, California and Georgia went to Philadelphia without jobs so they could experience the difficulties of unskilled workers trying to find factory or other manual jobs. One of the girls, a recent college graduate, went to 83 firms before she got a job folding cardboard cartons.

An Indian boy of the Brahman caste (highest social group) had the greatest trouble in job-seeking. For people of his caste in India, looking for a job is on a level with begging in the streets. He could not bring himself to apply for work until a counselor accompanied him.

As "Interns in Industry," the students live in a tenement-like "home" supplied by the Friends Service Committee, sponsor of the project.

The students found that their "home" was little different from its row-house neigh-

bors in the downtown area, one of the most densely populated urban areas in the United States.

The houses there have no yards or porches. The students, as the people around them, must seek to escape the heat of the house by sitting on the three concrete steps that lead from the doorway to the street pavement.

Dr. John L. McKenney, faculty member of the University of Arkansas, and his wife are counselor and chaperone for the group.

"Many of these kids plan to go into religious or social work," Dr. McKenney told SCIENCE SERVICE. In Philadelphia they will gain an insight into the problems of lowest income people that they could have gained in no other way."

The students buy and cook their own food, sleep on rows of canvas Army cots, and clean and repair their temporary home.

The inter-racial, inter-religious group will not have all work and no play, however. Although the students will stick to a slim budget, they plan to have picnics and weekend trips to nearby beaches and parks.

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GENERAL SCIENCE

Lack Foreign Science Info

► THE UNITED States is failing to gather enough scientific information about other countries, a Hoover Commission Task Force charged.

In a report to Congress, the Task Force pointed out that "our Government and its intelligence forces are not fully exploiting the possibilities of valuable military and technological data potentially available in scientific reports and technological publications issued in foreign countries."

Charging the State Department, which now has the job of gathering scientific data, with inadequate collection facilities and an inadequate number of staff experts to treat the material properly, the study group recommended that the job be taken away from the State Department and turned over to the Central Intelligence Agency.

The Task Force, headed by Gen. Mark Clark, further recommended that CIA be given the authority to appoint "such scientific attaches as may be necessary to carry on this work abroad." This is believed to mean that scientists and other technical experts be employed in evaluating scientific reports made by other nations.

The recommendation that the "responsibility for procurement of foreign publica-

tions and for collection of scientific intelligence" be given to CIA comes at a time when conflicting reports and underestimations of foreign technological abilities such as in aircraft design and production have become a major topic of public debate.

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PUBLIC HEALTH

Two Out of Three Now Have Health Insurance

► VOLUNTARY HEALTH insurance now protects nearly two out of every three men, women and children in the United States, the Health Insurance Council announced in New York. The figures are from its ninth annual survey of health insurance in America, as of Dec. 31, 1954.

By July 1, some 104,000,000 persons no longer had to worry about the hospital bill because they had voluntary health insurance against hospital expenses.

About 89,000,000 were protected by that same date against the surgeon's bill in case of operations, and 50,000,000 had regular medical expenses protection.

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• RADIO

Saturday, July 16, 1955, 5:00-5:15 p.m. EDT
"Adventures in Science" with Watson Davis, director of Science Service, over CBS Radio Network. Check your local CBS station.

Dr. George Gerard, assistant director of the research division of the College of Engineering, New York University, will discuss "Faster and Hotter Flying."

PHYSICS

Russians Develop Image Converter

► RUSSIAN SCIENTISTS appear to have developed a better system for recording and magnifying faint light flashes than any now used in the United States.

If their image tube, evidently a super-sensitive TV set, works as claimed, it would have many uses in industry as well as in astronomy and physics. Physicists in this country cannot decide definitely about the merits of the method, since the Russians' report in the *Proceedings of the Academy of Sciences of the U.S.S.R.* (Jan.-Feb.) is incomplete.

It states that a sensitive, electron-optical image-converter is being used, but does not give any details of the electronic equipment. Without these details, scientists can only puzzle as to how the Russians can obtain with a fast motion picture camera in about a thousand-billionth of a second pictures of the faint flashes of light given off in solid crystals. This is at least 100 times faster than the best U. S. electronic circuits now do.

Such a system as the Russians claim to have is being tried at laboratories in the U. S., but none is in common use.

Russian scientists reporting the new method were E. K. Zavoisky, G. E. Smolkin, A. G. Plakhov and M. M. Butslav.

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TECHNOLOGY

Filters Protect From "Nerve Gas" Insecticide

► THREE NEW filter materials for gas masks and respirators have been found effective against the insecticide demeton, an offspring of the nerve gases developed under Hitler, and formerly too dangerous for widespread farm use.

Agencies of the Government are probably testing the filters for possible protection against gases that might be used against U. S. troops in the future.

The new filters are the first to offer farmers complete protection against all commonly used insecticides, chemists and entomologists who tested the materials at the Department of Agriculture reported.

The filter materials are a special grade of fine-fiber asbestos, a fine-fiber wood pulp, and glass wool impregnated with a special resin. All three are now available commercially.

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RADIOACTIVITY IN INDUSTRY—Mechanical bands are at work in the atomic radiation laboratory at Esso Research Center, Linden, N. J., where world's most radioactive piece of material produced for peacetime use is now installed. The radiation source is in the form of 13-inch cobalt metal pipe, shown here in dummy form.

METALLURGY

Thermal Barrier Recedes

► SCIENTISTS HAVE pushed back the thermal barrier in jet engines a few more notches with a new high temperature alloy containing added percentages of rare earth elements.

The method improves the strength of one of the best high temperature metals, a cobalt-base alloy, researchers at the Naval Research Laboratory, Washington, have reported.

Rupture strength, stretching strength and creep rate were all improved, even for temperatures as high as 1,700 degrees Fahrenheit, they found.

One of the major problems of designers of parts for high temperature engines, such as jets, is failure of parts in contact with the fiery combustion gases. Use of extra rare earth metals in the alloy, described at the meeting of the American Society for Testing Materials in Atlantic City, N. J., may help solve such problems.

Rare earth elements are really not rare at all. They are a group of metals that are difficult to separate and that do not fit neatly into chemists' charts. Dr. J. R. Lane and J. E. Breen, who reported the work, used misch metal, a mixture of rare earth elements rich in cesium and lanthanum.

The new alloy might be used for turbine blades in jet engines and gas turbines.

The scientists found that rupture life improved as more rare earths were added. This held true at all temperatures and stresses tested. They explained that the rare earths act as a strong deoxidizer and scavenger in the alloy and increase the strength of the basic metal.

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GEOGRAPHY

Everest Climber Plans Trip to South Pole

► SIR EDMUND Hillary, who climbed Mt. Everest two years ago, hopes to reach the South Pole with the British Commonwealth Trans-Antarctic Expedition in 1956-57.

Sir Edmund is in Australia for discussions about supplies and equipment needed for the Trans-Antarctic Expedition. He is making a lecture tour of South Africa, and will return to London July 31 for the publication of his autobiography.

The New Zealand Government has allocated \$125,000 for the expedition. Its main task will be to set up a base on the Ross Dependency and to lay bases out on the polar plateau toward the South Pole.

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PSYCHIATRY

VA Probes What Is in TB Patients' Heads

► WITH THE aim of improving the chances of tuberculosis patients for recovery, the Veterans Administration is making a psychologic and psychiatric study of patients in 14 of its 21 TB centers and in many of its other hospitals with TB wards.

The fate of tuberculosis patients depends more on what is in their heads than on what is in their chests, the great medical teacher, Sir William Osler, once declared.

What the patients think and feel leads to the serious problem of irregular discharges, that is, patients leaving hospitals against medical advice before their treatment is complete.

Emotions and personality factors may affect body functions in such a way as to reduce resistance to tuberculosis. This can interfere with the healing process. VA scientists will explore this problem also.

They will try to develop methods of teaching relaxation to patients, so they can get maximum rest in bed and thus give their lungs a better chance to heal.

One of the chief worries of TB patients is a satisfactory job after discharge, one that they may fill without danger to their health. VA counseling psychologists, through early interview and the use of vocational tests, can reassure these patients of their employability and identify their special interests, skills and aptitudes.

The staff then can arrange with rehabilitation workers for exploratory work experience prior to the discharge of patients from the hospital.

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PLANT PATHOLOGY

Plant Virus Stopped By Chemical in Seed

► VIRUS DISEASES in plants may be kept from spreading from one generation to another by an inhibiting chemical inside the plant seeds.

Tobacco mosaic and cucumber mosaic viruses mixed with chemical extracts from seeds of tobacco and cucumbers either did not attack at all or did relatively little harm when inoculated into healthy plants, N. C. Crowley of the Waite Agricultural Research Institute, Adelaide, Australia, has found.

The rarity of seed transmission of plant virus diseases, particularly of some which are highly infectious, has been a long-standing problem for scientists. One theory held that viruses were limited to the vascular tissue of plants and could not move into the embryo.

The demonstration of inhibiting chemicals in the plant seeds may help explain this barrier to inheriting virus diseases.

Chemical analysis showed the inhibiting chemicals to be protein in nature, the scientist reported in the *Australian Journal of Biological Sciences* (Feb.).

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TECHNOLOGY

Silicone Rubber Used in High Temperature Tire

► ROCK AND glass, major enemies of tires, have now contributed the basic ingredients in a new experimental tire that can withstand temperatures above 500 degrees Fahrenheit.

Silicone rubber, having a molecular backbone of oxygen and silicon, the latter an element in rock and sand, is used in the tire along with glass fibers. Developed by the U. S. Rubber Company and Dow Corning Corporation, the tire is partially translucent and pink-orange in color. The outer ply inside the tire can be seen through the sidewall.

Breakdown of rubber under heat is a major cause of blowouts in automobile tires, but the new silicone rubber treads probably will not be used for them at this time because of high cost of materials.

Such tires may be especially suited to landing gear on supersonic aircraft, since temperatures up to 500 degrees Fahrenheit are generated on tire surfaces due to friction with the ground during landings. Fire sometimes breaks out in the rubber vapors given off when high-speed planes land.

Use of silicone rubber and glass fiber is new in the tire industry. Rayon, nylon and cotton are used in the cord of automobile tires today.

The tire, still in the developmental stage, can also withstand temperatures as low as 90 degrees below zero Fahrenheit.

Silicone rubber has long been known for its excellent temperature properties, but has been considered impractical for tires because of its low strength and wearing properties.

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FORESTRY

Over 8.8 Million Acres Of Forest Lost in 1954

► CARELESS SMOKERS caused 23,330 of the 176,891 forest fires last year, the U. S. Department of Agriculture has announced. In total, 8,832,963 acres of United States forest lands were injured.

There were 12% more forest fires last year than in 1953, but the total area injured dropped by more than a million acres and the number of fires is still under the average for the past five years. Forest fire fighters were called to an average of 485 blazes a day in 1954.

Campers in lands under organized fire protection started 4,875 fires in 1954 compared to 5,140 in 1953 and 5,667 in 1952. Figures were not available on the causes of fires on unprotected lands.

The drop in number of fires in the past five years was credited by the USDA to drives such as the Smokey Bear fire prevention campaign and the Keep Green Programs.

Three causes alone accounted for 75% of the forest fires reported: Smoking started 23,330 last year and 20,696 in 1953; trash

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and brush heap fires caused 30,318 last year and 22,537 in 1953, and incendiary fires caused 40,520 in 1954 and 30,186 in 1953.

The Department pointed out that millions of acres are still inadequately protected with too few lookouts to spot and report fires immediately, too few suppression crews to hit fires when they are small or too little equipment to do the job effectively on the fire line.

Other causes of fires and totals were: railroads, 2,872 in 1954, 2,619 in 1953; lumbering operations, 2,928 in 1954, 2,309 in 1953; man-caused fires with miscellaneous origins, 14,650 in 1954, 12,580 in 1953 and lightning, 7,780 in 1954, and 8,528 in 1953.

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PUBLIC HEALTH

Frozen Cooked Dinners Give More Work to FDA

► FROZEN DINNERS that are ready to eat after heating a few minutes in the oven save the housewife work but increase the Federal Food and Drug Administration's work load, George P. Lerrick, commissioner of Food and Drugs, said at the National Association of Retail Grocers meeting in Chicago.

The reason is that each additional step in processing a food, including quick freezing, peeling, breading, and cooking in the case of frozen cooked shrimp dinners, introduces another point where mistakes may occur. The mistakes may lead to contamination of the food or spoilage.

Recently thousands of pounds of breaded shrimp were removed from the market because of insect and rodent filth discovered in the breading material. As another example, Mr. Lerrick reported that an FDA inspector had found a lot of chicken pies that had stood too long and were sour before they were frozen.

"Of course the packer destroyed the pies when he learned of their condition, but," Mr. Lerrick told the grocers, "I shudder to think about the number of sick customers you might have had if those pies had been allowed to go out."

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INVENTION

Throw-Away Raincoat Receives U. S. Patent

► FOR PERSONS caught outdoors without protection in the rain, a Puerto Rican inventor has designed a paper raincoat to be sold in vending machines and thrown away after one use.

The disposable raincoat is made of either waterproof paper or glossy wax paper. It is fashioned in three sizes, small, medium and large, and can be adjusted to the individual's size. The inexpensive raincoat also features a do-it-yourself hood for the head.

The invention of Catalina R. de Cordero of Guayama, Puerto Rico, the raincoat received patent No. 2,711,538.

IN SCIENCE

PHYSIOLOGY

Electric Model Studies Body Temperatures

► MAN'S WELL-BEING and efficiency under widely-varying temperature conditions is being tested by an electric model of one of nature's most marvelous and complex mechanisms, the system that regulates body heat.

The model was designed by Norman E. Friedman for research under Dr. Craig Taylor of the department of engineering at the University of California at Los Angeles.

The device is actually a computer using conventional thermal-electric analogue designs. Current sources within the model provide simulation of body heat.

The study of human temperature regulations has many important applications in industry and military operations, Dr. Taylor pointed out. The design of human thermal environment in home or factory is the task of industry. The pilot's response to extreme cockpit heat in supersonic flight is of concern to the military.

Man's central mechanism of temperature control is like a dual thermostat that activates both heating and cooling units, Dr. Taylor said. Because of many complex, interacting factors, no simple formula can be used to determine human temperature reactions. Therefore, data obtained from the electric model are being checked against that obtained by actual measurements on the human body.

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PSYCHOLOGY

Stars Invisible During Day From Bottom of Well

► THE COMMON belief that stars can be seen in the daytime from the bottom of a dry well or a tall chimney is "without real foundation," a physicist has found.

The idea that a long shaft makes stars visible in daylight probably has persisted because of occasional chance sightings of the planet Venus, which is "frequently visible to the naked eye in broad daylight."

Dr. Alex G. Smith of the University of Florida made both photographic and photoelectric measurements showing a long shaft had "no appreciable effect" on the amount of light and the color of the daytime sky.

Other scientists have shown that ability to distinguish objects is impaired when the test field is a small, brightly lighted area surrounded by darkness, Dr. Smith reported in the *Journal of the Optical Society of America* (June).

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SCIENCE FIELDS

ENTOMOLOGY

Fruit Fly Studies Aid Poultry Production

► BLUE-BLOOD FAMILIES need a bit of the common touch to maintain their superiority, U. S. Department of Agriculture scientists have learned.

Studying the egg-laying performance of different breeds of fruit flies, they found that "elite" egg-laying offspring are less likely to come from mating two superior inbreds than from a superior line mated with an average or inferior performer.

The USDA scientists are applying lessons learned from fruit fly cultures to poultry breeding problems. After accounting for differences in their body sizes, there is a significant agreement between rate of egg laying and egg size in flies and chickens, the USDA said.

By using the fast-breeding flies instead of chickens, records on the effects of different breeding practices on egg production and size are obtained in a few weeks rather than the years necessary with poultry.

In both flies and chickens, about 10% of the egg production character is heritable, while egg size is about 30% to 40% dependent on genetic factors in them.

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CHEMISTRY-ARCHAEOLOGY

Zinc Content Shows Age of Old Brass

► THE CHEMIST has again given archaeologists a new technique for dating their finds and detecting forgeries. The method has served to detect a counterfeit of the days of Julius Caesar.

Ancient Roman brass objects can be accurately dated by analyzing the metal content, Dr. Earle R. Caley, Ohio State University chemist, reported. By analyzing coins of known date, Dr. Caley found that the oldest coins dating from about 45 B.C. contained the least copper and the most zinc.

In the following 250 years, there was a steady increase in the amount of copper and a corresponding decrease in the amount of zinc.

Under the Emperor Augustus, in 23 B.C., the coins contained nearly 22% zinc. By the time of Marcus Aurelius, 161-180 A.D., the zinc content had dropped to less than seven percent.

The drop in zinc content was probably due to the Roman practice of remelting old coins to make new ones. In the process, zinc was lost through oxidation and volatilization.

A coin of the days of Julius Caesar was found a counterfeit by Dr. Caley. It con-

tained less zinc than did genuine brass articles of the period.

Ancient brass objects other than coins might be dated by the zinc-content method, Dr. Caley says, because it is probable that all Roman brass was produced in the mints.

Another method of dating archaeological finds—those which contain wood, charcoal, or other plant remains—is to measure the amount of radioactive carbon they contain. This method was also a contribution from chemistry, an outgrowth of the work on the atomic bomb.

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MEDICINE

New Research Center To Study Body's Needs

► TO LEARN more about the body's needs and responses in this modern world, a new research center has been established at the University of California at Los Angeles.

Operated by the department of physical education, the research center already has four major projects under way. The center hopes to expand its operations in the future as larger physical facilities become available, according to Dr. Ben Miller, chairman of the department.

The research program will be under the direction of Dr. Lawrence Morehouse, a new member of the faculty formerly associated with the fatigue laboratory at Harvard University, Randolph Field's aviation medicine section, and the University of Southern California.

The four research programs now in progress include 1. study of the body's balance mechanism, 2. relation of muscle power to speed of movement, 3. a study of the value of warm-up in athletics, and 4. an investigation of physical growth and performance among school children.

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TECHNOLOGY

Electronic Instrument Used in Treasure Hunt

► ARMED WITH modern electronic devices, modifications of the wartime mine detectors, a party including scientists and a deep-sea diver is searching Block Island, a seven-mile-long island off the coast of Rhode Island, for the famous buried treasure of the pirate Captain Kidd.

It is believed to be the first time that hunters for Captain Kidd's treasure have been aided by modern scientific instruments. Formerly, treasure hunters have been guided by maps found under mysterious circumstances or by legends, intuition, and plain hard digging.

The expedition is sponsored by the Rhode Island Development Council and Radiac Company, a division of General Nucleonics Corporation. The treasure they are searching for is believed to be worth over \$700,000.

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PHOTOGRAPHY

3-D Camera Gives Accurate Close-Ups

► A 35 MM camera for taking accurate three-dimensional close-ups, either in color or black and white, will soon be available from the Perkin-Elmer Corporation, Norwalk, Conn.

Its unique optical design, eliminating distortions found in ordinary stereo cameras, was perfected by Dr. David Donaldson, who is associated with the Howe Laboratory of Ophthalmology, Harvard Medical School, Boston.

Previously, a photographer using stereo has had to rely on trial and error procedures in order to take close-ups of such small objects as human eyes or skin lesions. Either the camera or the subject had to be moved between exposures to get "matched" pictures.

The new camera has a built-in focusing arrangement to insure accurate results either by amateur or professional. It is expected to be particularly valuable for medical research.

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MEDICINE

Fight Cattle Disease To Save Human Hearts

► A MAJOR cause of heart deaths might be stopped by a successful fight against Bang's disease in cattle, it appears from research findings by Dr. Thomas M. Peery of George Washington University, Washington.

Bang's disease in cattle is known as brucellosis in humans. This infection, Dr. Peery believes, may damage heart valves and bring on a condition similar to that of rheumatic fever. He thinks a significant percentage of damaged hearts now attributed to rheumatic fever may actually be caused by brucellosis.

"On the basis of clinical symptoms and signs there is no possibility of differentiating these two diseases with certainty," Dr. Peery said. "Sensitive laboratory facilities of the pathologist are necessary for a relatively accurate diagnosis, but even under the most ideal laboratory set-up brucellosis is still a most difficult disease to diagnose properly."

Brucellosis is a bacterial disease contracted in a mild but persistent form by the drinking of raw milk. In its more serious forms, it is an occupational disease among farmers, butchers, veterinarians and others handling farm animals.

By studying both patients in the hospitals and case histories in the literature, Dr. Peery noted that heart involvement similar to that of rheumatic fever, which annually kills and cripples more children than polio, was an important sequel to brucellosis.

Further studies of the literature on autopsies by Dr. Peery indicated that heart inflammation is the chief cause of death in fatal brucellosis.

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MEDICINE

Heart Power Measured

Which hearts are likely to fail and are in need of rescue? Predictions are possible now that heart's efficiency as pump can be graded accurately by a new instrument.

By JANE STAFFORD

► HUMAN HEARTS now have a new kind of test that promises to spot trouble before it happens in the blood-pumping mechanism.

Take two case histories from the clinical laboratory where this new type of instrument is having its first clinical usage. The ballistocardiograph principles are old, but the type of instrumentation and the techniques are new.

The captain had been picked for an important, two-year mission in the Middle East. He was one of our older pilots, a man of experience and he was judged to be just right for the job.

Before he left, Civil Aeronautics Administration medical men, who have the responsibility for seeing pilots are fit, gave him a careful examination, including electrocardiograms of his heart. Their tests showed him in good condition and he was okayed for the mission.

To be sure, one test showed a heart abnormality. But this was a new test given the captain, along with many other pilots, as a trial of the test's value. Within a few weeks after arrival at his foreign post, the captain had a heart attack and had to be sent home.

Continuous Progress Made

The heart attack could have been predicted from the new test's findings, but no one at the time was sure about it. The other clinical story has a happier ending.

A 55-year-old business man wanted to go on flying his own plane. CAA turned him down for renewal of his pilot's license because of abnormal electrocardiogram findings. The man protested that his heart never bothered him and did not keep him from doing what he wanted to do. The new test showed he was right. His heart abnormality was not interfering with its functioning.

These examples indicate that there is continuous progress in keeping track of the human heart. They show that a new test of the heart now being developed may make the CAA examinations even better in the future. The new test will also, it is believed, help doctors generally to better diagnosis of the state of their patients' hearts.

A number of medical scientists have devised machines for the ballistocardiograph test in recent years. Unfortunately, there has been considerable variation in results

due to variations in techniques and equipment. Dr. J. E. Smith, cardiologist for CAA, has been working toward standardization of the equipment and technique.

The ballistocardiograph, he explained, measures the efficiency of the heart as a pump. That is, it tells how fast fluid, or blood, is coming out of the pump. Dr. Smith compared the information about the heart given by the ballistocardiograph to the horsepower measure of an automobile's power. An electrocardiograph can be compared to instruments for testing the battery and spark plugs of an automobile. Both kinds of information are needed about hearts and automobiles.

Scale Pointer Quivers

The ballistocardiograph gets its name from the fact that each time the heart forces blood out into the body there is a shock, something like the recoil of a gun. The first part of the name comes from a Greek word meaning to throw and is familiar to military men from the word

ballistics. Cardio refers to the heart and the graph is the record.

If you stand on a well-balanced spring scale and watch the pointer quiver, you will be seeing the shock of ejection of blood from the heart. The idea for the first ballistocardiograph is said to have come to a medical scientist when watching this scale pointer quiver.

Body's Movement Measured

Earlier ballistocardiographs measured the displacement of the body, that is, how far it travels, with each of these shocks. Dr. Smith and associates have been developing an instrument to measure the velocity and acceleration of motion of the body due to ejection of blood from the heart. The displacement, velocity and acceleration, in response to each heart beat are, Dr. Smith finds, all related to the force of the heart beat.

Working with scientists at the National Bureau of Standards, he was able to devise a machine that measures all components of the same heart beat simultaneously. And he has found a way to make the machine keep its calibration, so that it is always in adjustment and does not need to be set right before each use.

Vibration from motors, elevators and the



HEART HAMMERS OUT INFORMATION—Dr. J. E. Smith gives a patient a ballistocardiograph test. Some patients need reassurance, because wires and dials, especially when an electrocardiogram is made at the same time, as on this patient, are frightening. Pilots, used to many wires and dials, take the first test more calmly.

like in a building can throw the delicate machine off. So the instrument Dr. Smith works with at George Washington University Hospital, Washington, is set on a concrete block. The patient lies on a wooden table top placed on the concrete block. It is rather hard, but the test does not take long.

The patient's feet rest on two blocks and a wooden board attached to a bar magnet lies across his shins.

If a rigid spike could be put into the shin bone, the measurement of the heart's ejection force and power could be measured without interference from the movement of the instrument. Since this was obviously not practical, Dr. Smith and associates designed a bar magnet of exactly the right weight which picks up the motion of the body and sends an amplification of this to the graph record.

Dr. Smith believes that with this type of instrument, a reliable indication of heart valve damage can be obtained, such as in aortic insufficiency when the aortic valve leaks and puts a strain on the left side of the heart. Obstructions of the aorta (main artery leaving the heart) will give charac-

teristic patterns only in the displacement curves.

In angina pectoris, the low forces of ejection can be seen much more clearly on the acceleration curves when the displacement curves look normal.

The instrument is now being used to study patients with heart valve disease called "mitral stenosis." It may be helpful in determining the severity of the valve damage as well as to show improvement in blood flow after operation on the valve.

The ballistocardiograph may help prevent heart attacks by giving more exact information about heart function. When doctors find evidences of faulty conditions, it may be possible to change the heart pumping mechanisms so that heart attacks will be less likely to occur.

Among the first 50 pilots between 40 and 50 years of age Dr. Smith tested, all of whom were normal by regular CAA tests, eight showed an abnormal heart condition on his test.

Of these eight pilots, three have developed definite heart trouble, with one death within two years.

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AGRICULTURE

World Horse Shortage

► A SHORTAGE of work horses is affecting farm production in Russia.

A world survey has shown that having too few draft horses is a factor holding down agricultural production in Russia, India, China, Vietnam and the Philippines.

The total number of horses in the world continues to decline, the U. S. Foreign Agricultural Service reported in *Foreign Crops and Markets* (May 23).

Estimating the current population at 74,500,000, the agriculturalists pointed out that this is a one percent drop between 1953 and 1954, and a 22% decline since prewar days. The continuous decline reflects the increasing use of farm machinery.

Geographic areas showed contrasting trends. The number of horses has noticeably decreased in North America, Western Europe and Oceania. On the other hand, there have been increases in Russia and Eastern Europe.

Continued use of horses for work and transportation can be expected in Asia and some parts of Africa, Central and South America, the report said, but "it seems probable that animal draft power will give way to the increased use of tractors, automobiles and trucks in Eastern Europe, the U.S.S.R. and many areas of Africa and South America in the years ahead."

The latest estimates, as compiled by the Service, put the 1955 U. S. horse population at about 3,106,000. In 1953, Russia was reported to have had 15,300,000; Brazil, more than 7,000,000, and China, over 5,600,000.

The survey also tallied the number of mules and water buffaloes in the world.

The world total for mules and asses is about 50,000,000. It is estimated that the U. S. mule population is down 69% since before World War II, now numbering 1,400,000.

Water buffaloes, used for both draft purposes and as milk producers, are estimated to number approximately 78,000,000.

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MEDICINE

One in Seven Older Men Goes to Hospital a Year

► ONE OF every seven men aged 60 or over goes to the hospital in the course of a year, statisticians of the Metropolitan Life Insurance Company in New York reported.

The findings are based on the company's personnel protected by the company's group insurance program. It included those actively at work, the permanently disabled and the retired, but not those in Pacific coast states and Canada.

The men 60 years and older went to the hospital at a rate about twice that of men under 45.

Leading causes of hospitalization in the older group were, in order of numerical importance, diseases of the heart, diseases of the digestive system, operation for removal of the prostate gland and hernia operations.

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The birch leaf-mining sawfly has been a major pest of gray birch, white birch and paper birch since its introduction from Europe more than 30 years ago.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

CHEMICAL PROPERTIES OF ORGANIC COMPOUNDS: An Introduction—Elliot N. Marvell and Albert V. Logan—*Wiley*, 326 p., illus., \$4.75. Presenting the college student with an understandable approach to the fundamental principles of organic chemistry.

DIELECTRIC BEHAVIOR AND STRUCTURE: Dielectric Constant and Loss, Dipole Moment and Molecular Structure—Charles Phelps Smyth—*McGraw-Hill*, 441 p., illus., \$9.00. Discussing the relations between dipole moment and molecular structure.

EVERYTHING AND THE KITCHEN SINK: How the First Century of Industry Created Our First Century of Good Living—*Farrar, Straus and Cudahy*, 160 p., illus., \$4.00. The story of recent industrial development published in commemoration of the centennial of the Crane Company.

THE FORD FOUNDATION REPORT FOR 1954—H. Rowan Gauthier Jr., president—*Ford Foundation*, 114 p., illus., paper, free upon request direct to publisher, 477 Madison Ave., New York 22, N. Y. Research supported by the Foundation includes some on psychology and the social sciences. Since the Foundation's fiscal year has been changed to end on September 30, this report covers the nine months ending on that date.

GENERAL ENDOCRINOLOGY—C. Donnell Turner—*Saunders*, 2d ed., 553 p., illus., \$8.00. Internal secretion is here treated as an over-all

phenomenon extending throughout the whole range of animal and plant life, not just in the higher vertebrates.

A GUIDE TO THE ORGANIZATION OF WOMEN'S AUXILIARIES IN HOSPITALS—*United Hospital Fund of New York*, 67 p., illus., paper, \$1.00. Based on the Fund's 76 years of experience.

AN INTRODUCTION TO NATURE: Birds, Wild Flowers, Trees—John Kieran—*Hanover House*, 223 p., illus., \$6.00. Combining in a single large volume the three popular Kieran books. With beautiful illustrations in full color. For children and other nature lovers.

A LABORATORY MANUAL OF GENERAL CHEMISTRY—Saverio Zuffanti, Arthur A. Vernon and W. F. Luder—*Saunders*, 310 p., illus., paper, \$3.75. Although written with one textbook in mind, the "General Chemistry" of the same authors, it is possible to use it with any first-year textbook and various kinds of laboratory courses.

THE MANAGEMENT OF MENTAL DEFICIENCY IN CHILDREN—I. Newton Kugelmass—*Grune & Stratton*, 312 p., illus., \$6.75. Early diagnosis and proper treatment of mental defect can result in the salvage of lives that otherwise are largely wasted.

THE MEGACHILINE BEES OF CALIFORNIA (HYMENOPTERA: Megachilidae)—Paul D. Hurd Jr., and Charles D. Michener—*University of California Press*, Bulletin of the California Insect Survey, Volume 3, 247 p., illus., paper, \$3.50. Providing usable keys, descriptive comments and data on distribution and floral visits.

MIRACLES BY THE DOZEN—*Mercer Publishing Co.*, 15 p., illus., paper, 9 cents. Telling the story of the chemical industry.

MORPHOLOGY AND BIOLOGY OF STURMIA HARRISINA COQUILLETT (DIPTERA), A PARASITE OF THE WESTERN GRAPE LEAF SKELETONIZER—Owen J. Smith, Paul H. Dunn and John H. Rosenberger—*University of California Press*, 37 p., illus., paper, 50 cents. On an important parasite introduced into southern California to combat the western grape leaf skeletonizer.

REPORT ON THE INVESTIGATION OF TRAVEL OF POLLUTION—*California State Water Pollution Control Board*, 220 p., illus., paper, limited number free upon request direct to publisher, Room 610, 721 Capitol Ave., Sacramento 14, Calif. Information pertinent to the question of whether a water supply can be replenished with reclaimed waste water.

SEARCH FOR PURPOSE—Arthur E. Morgan—*Antioch Press*, 197 p., \$3.00. Autobiography of the man who is generally known as the first Chairman of the TVA.

THE STRUCTURAL RELATIONS OF NATURAL PRODUCTS: Being the First Weizmann Memorial Lectures, December, 1953—Robert Robinson—*Oxford University Press*, 150 p., \$4.00. Surveying the molecular structure of several of the chief groups of plant products in order to find common features that may be relevant to the problems of biogenesis.

A TEXTBOOK OF MEDICINE—Russell L. Cecil and Robert F. Loeb, Eds.—*Saunders*, 9th ed., 1786 p., illus., \$15.00. In this new edition, an attempt has been made to reflect the many strides in medicine during the past four years. Contains the work of a distinguished group of contributors.

VOLUNTEERS IN MENTAL HOSPITALS—Part One, Marjorie H. Frank, Ed., Part Two, O. Arnold Kilpatrick—*National Association for Mental Health*, 16 p., paper, 25 cents. Directed to administrators and staffs of mental hospitals and to community groups.

WALT DISNEY'S VANISHING PRAIRIE: A True-Life Adventure—Jane Werner and the Staff of the Walt Disney Studio—*Simon and Schuster*, 124 p., illus., \$2.95. The story of the wildlife in America's West, illustrated with breath-taking color stills made in the course of shooting the motion picture.

THE WHY OF THE TEXTILE STANDARDS—Jules Labarthe—*Mellon Institute*, 4 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. A series of three short articles on why textiles sometimes disappoint consumers.

THE YEARBOOK OF THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS 1955—The Secretary General of ICSU, 69 p., paper, 55. Containing a directory of members.

Science News Letter, July 9, 1955

MEDICINE

See Humans Smoking Radioactive Tobacco

► FUTURE TESTS of tobacco smoke may be made with human volunteers smoking radioactive tobacco. This possibility was hinted in a report from the American Tobacco Company, Richmond, Va.

Such tests would show where different constituents of tobacco go when the smoke is inhaled.

The company is now making tests with tobacco plants that have had various radioactive active compounds introduced into the living plant. The compounds are selected to tag different constituents of the tobacco.

One such study traces the disposition of sugars in tobacco. It is described in a report from the company as follows:

Sugar from radioactive tobacco is extracted and added to tobacco grown in the normal way. Then tobacco with radioactive sugar is burned and the smoke introduced into an experimental animal. Trace elements among combustion products of the radioactive sugar are rapidly absorbed and dispersed throughout the animal's body.

The animal's organs are then checked for activity with a Geiger-type anti-coincidence counter that detects the faintest traces of radioactivity.

The levels of activity at various points indicate just where the combustion products go and the time required for them to reach these organs. Similarly, the amount and rate of elimination can be ascertained.

The label also serves as an aid to precise identification, for it provides a means of "tracking down" all of the products of this single compound on their journey from tobacco to smoke, from smoke to the animal organism and finally to its elimination.

The radioactive elements being used give off soft beta rays which are relatively harmless, in contrast to hard gamma rays. For this reason, the company's report states, "it may be practical to use humans in future experiments."

Science News Letter, July 9, 1955

DO PEOPLE "EXPLODE" IN YOUR OFFICE?

ARE you, as a business executive, a skilled "human chemist"—good at handling your fellow-workers and in getting them to work well with each other? Or do people "explode" in your office—or in their contacts with some of their associates?

In working with people, there is nothing you do which does not involve "human chemistry." Your job is not merely to prevent "explosions," but also to use all the different "human chemicals" which comprise your organization in a manner that will produce the best work, the most profits, and the greatest progress for the business.

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How to do this is told in the 87 idea-packed pages of *The Executive as a Human Chemist*, by Thomas Dreier, a brochure which can be read at one sitting, but which will serve you usefully all the rest of your life. (One large firm purchased 1,700 copies for its officers, department heads and sales agents.)

Simply clip this ad, attach it to your letter-head on a sheet of paper with your name and address, and enclose \$1. Your copy of *The Executive as a Human Chemist* will be mailed you promptly. (Special offer: 10 copies for \$7.50.) **THE UPDEGRAFF PRESS, LTD., 319 Harwood Bldg., Scarsdale, New York.**

MEDICINE

Muscle Weakness Drug

► A DRUG for the serious muscle weakness disease, myasthenia gravis, has been tried on more than 75 patients and 59 are still taking it with more benefit than from medicines they had taken before, Drs. Robert S. Schwab, Clare K. Marshall and William Timberlake of Massachusetts General Hospital, Boston, reported in the *Journal of the American Medical Association* (June 25).

The new drug is known by the trademark Mysuran chloride. It has a longer lasting effect than either neostigmine or Mestinon, two other drugs that have been used in myasthenia gravis. Some patients report fewer side reactions with the new drug than with the older ones.

A few have to take as many doses daily as they did of the other drugs, but report feeling better, stronger and closer to their normal health.

Myasthenia gravis is marked by fatigue and exhaustion of the muscular system with progressive paralysis. The muscles, however, do not waste away. Any muscle of the body may be affected, but those of the face, lips, tongue, throat and neck are especially affected. Eyelids often droop. Pa-

tients may be unable either to chew or swallow.

Before 1934, there was no effective treatment and between 80% and 90% of the patients died within the first two years after the disease started. In that year an English physician, Dr. Mary Walker, discovered that the anticholinesterase drug, physostigmine, and later, neostigmine, were effective in overcoming the muscle weakness temporarily and in keeping the patients alive.

These drugs and the newer Mestinon have been used to treat myasthenia gravis patients since then. Patients take these medicines in pills, but may have to take their pill every hour day and night because the effect wears off so quickly. This and unpleasant side effects make treatment trying.

The new drug's advantage is that it does not have to be taken so often. The patients, however, must have greater care and supervision to guard against over-dosage. None of the drugs cures the condition. The drugs only relieve the symptoms.

Mysuran is made by Winthrop-Stearns, Inc., of New York.

Science News Letter, July 9, 1955

ICHTHYOLOGY

Human-Tissue Polio Virus

► SOLUTIONS TO some of the big problems of poliomyelitis vaccination appear to have been found by a group of University of California scientists.

They reported in *Science* (July 1) development of a way of growing the virus that may eliminate one possible hazard of the vaccine. The method would also make production cheaper and more convenient.

The scientists said they had successfully grown polio virus on the tissue cultures of cells taken from part of human afterbirth. The tissue is the amniotic membrane, the

lining of the sac that surrounds infants in the uterus.

At the present time, polio vaccine is made from virus grown in monkey kidney tissue. Some scientists have suggested that the vaccine made from monkey kidney tissue may sensitize some individuals to kidney protein, with some risk of allergic nephritis.

In addition, the importation of monkeys from India, with elaborate care and operative procedures being required, makes monkey kidney tissue culture expensive and inconvenient.

Cultivation of polio virus on such a human non-organ tissue as the amniotic membrane—long an objective of polio research—apparently would eliminate the sensitization problem.

Use of the method should cut the cost of vaccine production. Amniotic membranes presently are waste tissues, and could be salvaged in clinics and hospitals all over the country. One amniotic membrane will yield about as much virus as one kidney.

The scientists reporting the work, Elsa M. Zitcer, Jorgen Foch and Thelma H. Dunnebacke of the Biochemistry and Virus Laboratory, said all three types of polio virus can be mass produced by the method.

The work was supported by grants from the U. S. Public Health Service, the American Cancer Society, the Rockefeller Foundation and Lederle Laboratories.

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Science News Letter, July 9, 1955

ENTOMOLOGY

Spider Snubs Tradition, Prefers Mice to Flies

► WANT A better mousetrap? How about a spider that enjoys dining on mice?

Just such a playful creature inhabits the jungle wildlife refuge and biological experiment station on Barro Colorado Island in the Canal Zone, the Smithsonian Institution in Washington has reported.

According to the institution, the spider is an exceptionally large and equally poisonous tarantula that has been observed to devour a mouse much bigger than itself in about 18 hours. Although its eating habits are not in the best traditions of dining etiquette, this natural mouse catcher is reported to leave a small ball of some skin, hair and bones at meal's end.

To demonstrate the "Won't you walk into my parlor, said the spider to the mouse" routine, the scientists at the Island station put a mouse into a cage with the tarantula.

With lightning speed, the spider struck the mouse on the chin with its fangs. The little mammal died very quickly, but the spider kept its fangs imbedded for half an hour. Assured that its victim had had it, the spider picked it up and carried it into a corner where it covered it completely with a silk web.

Then in the tarantula's customary way of feeding, states the Institution, the spider sucked its victim dry of body juices. When the juices were all gone, the tarantula ate the skin and flesh.

"Occasionally," adds the Institution account of the feast, "it would move about the cage, carrying with it the silk-shrouded body of its prey."

Science News Letter, July 9, 1955

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ORNITHOLOGY

NATURE RAMBLINGS

Hummingbird

► LIKE a big bee in feathers, the hummingbird darts about the garden, suspended in mid-air on its invisible vibrating wings while it probes deep-throated flowers.

It is always a mental effort to regard this dynamic molecule of life as a bird, it is so small and flies so much more in the manner of an insect.

Other small birds can hover for short moments, but the fluttering of their wings is relatively slow and one can see them as they beat. No other bird has so perfected the art of hovering flight as the hummingbird.

In the eastern United States there is only one species of hummingbird, the ruby-

throat. This one, however, ranges everywhere east of the Rockies, well up into Canada, where you would hardly expect to find tropical visitors. For the hummingbirds in general are of the tropics, and ours is a commuter who comes north to rear a family and then returns to a warm climate for the winter.

Ruby-throated hummingbirds winter all the way from Florida and Texas south to the Isthmus, and appear sporadically in Cuba; in spite of their diminutive size they are quite evidently efficient travelers.

The hummingbird does not spend all day at that dizzying occupation of flying at the rate of a mile a minute without moving from the spot. That kind of flying requires the burning up of too much energy to be kept up indefinitely. He does it in short spurts, resting between whiles on a slender twig or perhaps a trellis wire, preening his feathers.

Nor does the hummingbird feed, insect-wise, on honey, as is often imagined. He likes meat as well as anybody, only he is willing to take it in little bits—as tiny insects in the bottoms of the flowers. That is really what his long, probing beak is after most of the time.

The best way to secure regular visits from hummingbirds is to plant a trumpet creeper vine somewhere about the premises. The deep-throated, flame-colored flowers of the tropical plant are the favorite food-counters of these hovering, humming, darting small bits of feathery energy. But they can be lured by other deep or long-spurred flowers that common bees have trouble getting into, for example, the larkspur.

Science News Letter, July 9, 1955

AERONAUTICS

Learning to Beat Heat

See Front Cover

► TO HURL atomic bombs between continents, it will be necessary to beat heat up to 8,000 degrees Fahrenheit and establish control of missiles speeding as high as 15,000 miles per hour and rising up to 600 miles into space beyond the earth.

This is the research task of the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics, Moffett Field, Calif.

No enemy defense could stop a long range missile speeding at 20 times the speed of sound. It would be enormously difficult to hit it in the few seconds between the object's detection and its impact.

Heat is the great barrier to hypersonic missiles. Temperatures high enough to melt or vaporize most metals quickly develop at such high speeds in the air next to the skin of the missile.

The latest idea to lick this heat is to apply to the metal missile the way the human body cools its skin. This is transpiration cooling or evaporating a liquid through a porous skin.

While the missile is outside the earth's thin atmosphere, there is little chance of controlling it. When it drops back into the earth's air toward the end of its flight, however, scientists want to work out new ways of controlling it, possibly by tail fins that are useless in space.

The problems of such high flight and high temperature are being studied in new wind tunnels, among them a heat-transfer tunnel 10 by 12 inches in size.

Shown on the cover of this week's SCIENCE NEWS LETTER is an infrared photograph of a laboratory experiment simulating aerodynamic heating on a model placed in a jet of hot gas. It shows how the sharp nose and thin wing leading edges heat up more rapidly than thicker parts of the model.

Another tunnel at Ames Laboratory is an eight-inch tunnel that lowers air pressures and densities to altitudes corresponding to over 100,000 feet.

Electronic computers are also being used to predict and study what will happen to such missiles in the future.

Science News Letter, July 9, 1955

ARCHAEOLOGY

Indians Saw Supernova

The brightest celestial object other than the sun, probably ever seen by man, the supernova of July 4, 1054, was spotted by American Indians, cave paintings have revealed.

► DISCOVERY OF the brightest "new star" ever recorded by man was made by American Indians on July 4, 901 years ago, an archaeological survey by the Museum of Northern Arizona has revealed.

A heavenly body six times as bright as the planet Venus appeared to come between the earth and the crescent moon on July 4, 1054.

The event was set down by Japanese and Chinese astronomers in Oriental chronicles, but has not been included heretofore in astronomical records from any other part of the world.

Two pictographs of the same event were found, one cut into a Navaho Canyon wall, and the other drawn with a lump of hematite, a red iron-containing ore, on a cave wall at White Mesa, Ariz. These ancient astronomical pieces of art were the work of prehistoric Indians.

The object that made its spectacular appearance on July 4 so long ago is called a supernova. A nova or "new star" is not really new. Because of a sudden breakdown of the normally stable energy conditions in its interior, a nova abruptly flares up to thousands of times its normal brightness, so that a star never before visible from the earth bursts into brilliance.

The star that blazed on July 4, 1054, was not a nova but was a supernova, however. A supernova flares up to several million times its original brightness.

Oriental records show that the supernova of 1054 A.D. first became visible in the morning sky of July 4.

"Early on the morning of July 5, before dawn," Dr. William C. Miller of Mount Wilson and Palomar Observatories stated in the *Plateau* (June), journal of the Museum, "the crescent moon stood just two degrees north of the supernova, making a configuration of spectacular beauty. This supernova

was probably the brightest object other than the sun ever to have appeared in the sky in the memory of man."

The blazing star was so bright it was visible in daylight for 23 days and was seen at night for nearly two years. The gas blown out from the exploding star forms the Crab Nebula in the constellation of Taurus, the bull.

This nebula recently became of new interest to astronomers when they discovered it was a source of radio noise.

Astronomers tune their radio telescopes on the Crab Nebula to measure the extent of the sun's corona as the sun passes between the radio source and the earth.

The early American astronomical art first attracted the attention of archaeologists making the survey because it shows a crescent with a circle just below it. The crescent is not a common figure among petroglyphs and pictographs of northern Arizona.

The two prehistoric cliff sites at which the pictographs were found are both open to the south and have unobstructed views of the eastern sky. Careful search of the vicinity brought to light evidence that they were occupied at the time of the supernova.

Both pictographs show the crescent moon at the same phase and both show the circle, presumed to represent the supernova, south of the center of the moon, which agrees with the facts.

Science News Letter, July 9, 1955

TECHNOLOGY

Navy Finds Jets Can Dig Holes in Arctic

► JET ENGINES can dig holes in frozen ground. An arduous task by conventional methods, the process would be particularly useful for setting anchor posts and explosive charges in the Arctic.

Tests reported by the Office of Naval Research showed that holes six inches or less in diameter and as deep as 40 inches could be blown into the ground by the vibrating column of air. An eight-pound valveless engine with an extra long tail was used.

Wider holes were dug by augmented engines. In tests, both units easily penetrated eight inches of frozen ground and then dug into the ordinary ground below.

Directed downward, the jet loosens the earth and blows it away as the nozzle moves into the ground. As the hot gases hit the frozen ground, a rotating scraper hits the thawed earth.

Science News Letter, July 9, 1955

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Questions

ENGINEERING—How much congestion is relieved by extra lanes on hills for trucks? p. 21.

□ □ □

ENTOMOLOGY—What value to poultry breeding is the study of fruit flies? p. 23.

□ □ □

MEDICINE—What is the ballistocardiograph? p. 26.

□ □ □

PHYSIOLOGY—How can workers with ears susceptible to damage be selected? p. 20.

□ □ □

PSYCHOLOGY—Are stars visible from bottom of well? p. 24.

□ □ □

SOCIOLOGY—Why are 30 U. S. and foreign students living in a Philadelphia slum area? p. 22.

□ □ □

Photographs: Cover, National Advisory Committee for Aeronautics; p. 19, Bell Telephone Laboratories; p. 21, Northrop Aircraft, Inc.; p. 23, Esso Research and Engineering Company; p. 26, Fremont Davis; p. 32, Minnesota Mining and Manufacturing Company.

BIOCHEMISTRY

Radiation-Killed Animals Are Harmless as Food

► FLESH OF livestock killed with lethal doses of cobalt 60 radiation apparently is harmless to dogs feeding on it, scientists at Oak Ridge National Laboratory, Tenn., have found.

Pure-blooded beagle and greyhound pups eating flesh from irradiated cattle and sheep showed no weight differences from normal growth of pups fed non-irradiated food. Blood tests did not vary from the normal picture, and autopsies failed to show pathological changes in the internal organs of the pups in the experiment.

R. H. Wasserman and B. F. Trum of the Agricultural Research Program at the atomic center, reported their research in *Science* (June 24).

Science News Letter, July 9, 1955

GOLF: Your LEFT SHOULDER makes the amazing difference!

One of the most startling discoveries to emerge from wide research in the golf swing is that your game literally hinges on your left shoulder.

How this is so and how to use this great discovery to improve your own game beyond all expectations in a matter of short weeks is set forth in **THE GOLF SECRET** by Dr. H. A. Murray, orthopedic surgeon, and golf researcher, who has applied his expert knowledge of anatomy in this sweeping and utterly different study of the golf swing.

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Science News Letter, July 9, 1955

TEMPERATURE CONTROLS for surface cooking are featured in a new line of built-in electric ranges. An element in the center of surface units contacts the bottom of the pan being heated and automatically maintains heat at temperatures of 145 to 425 degrees, as dialed by the cook.

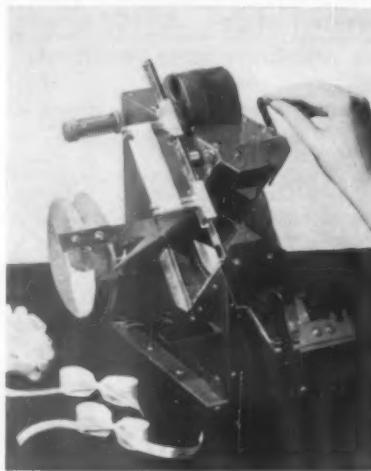
Science News Letter, July 9, 1955

PLASTIC CATCHES for cabinet doors are noiseless and smooth in action. As the cabinet door is closed, a rounded screw fitted in the door slides into a plastic cup that grips it firmly by friction fit.

Science News Letter, July 9, 1955

NYLON INSERTS in the heels of several new lines of shoes add to the life of the heel and help prevent "running-over." The inserts will not scratch floors, and are lighter and less expensive than cast iron heel protectors.

Science News Letter, July 9, 1955



BOW TYER, shown in the photograph, turns out five gift-wrapping bows every two minutes, and can form bows for over 100 bow variations. A turn of the gadget's handle forms a hank of ribbon that the operator puts through the notching mechanism and ties with a pre-cut strip of narrower ribbon.

Science News Letter, July 9, 1955

FALSE TEETH of vinyl resins just bounce back if accidentally dropped onto tile bathroom floor. Palate and teeth are molded as a single unit, eliminating joints which may be penetrated by dirt or moisture. Break-resistant and lightweight, the denture is available in several shades to closely match natural teeth.

Science News Letter, July 9, 1955

A-BOMB SHELTER, big enough for a family of six, is made of lead-clad steel and is equipped with sanitary facilities, air filter, Geiger counter, radio and emergency oxygen. The shelter is installed underground and includes a periscope for viewing above ground. Electricity is supplied by batteries if lines connected to house power fail.

Science News Letter, July 9, 1955

CAST CUTTER takes much of the pain out of the removal of plaster casts from healed fractures. Before applying the cast, two wires are placed on the splinted limb. To remove the cast, one end of the wire is attached to a hand tool which winds up the wire, thereby splitting the cast.

Science News Letter, July 9, 1955

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Do You Know?

Only insects cause greater damage to farm crops than fungi.

Protozoa and a number of similar micro-organisms require some of the vitamins necessary for humans.

There is one vehicle for every 700 feet of every lane in both directions of all streets and highways in the United States today.

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More than a million tons of corncobs were used last year in factory operations and industrial products.

A temperature between 68 and 72 degrees Fahrenheit is correct for the sleeping room of a baby between five and eight pounds.

To produce one carat of cut diamond from volcanic pipes requires the removal from great depths of a mass of blue ground 640,000,000 times the diamonds' weight.